

REMARKS**Status of Claims**

Claims 1-8 are pending, of which claims 6-8 have been withdrawn. Claim 1 is an active independent claim. Claim 1 has been amended to correct informalities in the claim language and to more clearly define the present subject matter. Care has been taken to avoid introducing new matter. Favorable reconsideration of the application in light of the following comments is respectfully solicited.

Claim Rejection – 35 U.S.C. § 103

Claims 1-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Otani et al. (JP62083444). This rejection is traversed for at least the following reasons.

Applicants respectfully submit that Otani fails to disclose the diameter of silicon grain, and it would not have been obvious to adjust the average grain size to the claimed range. As the Examiner concedes, Otani fails to disclose that the average grain size of silicon is 4 μm or less. However, the Examiner asserts that discovering an optimum value of a result-effective variable requires only routine skill in the art and thus it would have been obvious to adjust the grain size to the claimed range. Applicants disagree.

First, Applicants respectfully submit that Otani fails to disclose or recognize that the average grain size of silicon affects heat resistance of an aluminum alloy. In the present disclosure, silicon is added to improve the heat resistance of the aluminum alloy. In Otani, however, silicon is added to the aluminum alloy to improve wear (i.e., abrasion) resistance (see, page 6, lines 3-4 of the English translation of Otani). Thus, the average grain size of silicon is not recognized as a result effective variable with respect to the heat resistance of the aluminum alloy.

Second, adjusting the average grain size of Otani to the claimed range of 4 μm or less would impair the purpose or function of Otani. At page 6, lines 7-9 and 13-16 of the English translation of Otani, it is stated that “[t]he size and quantity of primary crystal Si grains greatly depends on the solidification rate of the alloy and the amount of Si,” and “[i]f the amount [of silicon] is less than 5wt%, the effect of improving the abrasion resistance is very small.” This means that making the grain size of silicon smaller would decrease the abrasion resistance and impair the purpose of the Otani’s alloy. This is also evidenced by JP 11-226723, the English abstract of which is attached hereto. Similar to Otani, the purpose of JP ‘723 is to obtain higher wear (abrasion) resistance. For this purpose, JP ‘723 adjusts the average grain diameter of Si to the range of 7-15 μm . Paragraph [0007] of JP ‘723 states:

[0007] When maintaining a hypereutectic aluminum-Si molten metal at a temperature below the pro-eutectic Si crystallization temperature, proeutectic Si begins to crystallize in the hypereutectic aluminum-Si molten metal in the sleeve 2. By maintaining this state for 2 to 5 seconds, crystallized proeutectic Si grows up to be proper particle diameter effective to improve wear resistance. The particle diameter and quantity of crystallized proeutectic Si are adjusted with the temperature and retention time of a hypereutectic aluminum-Si molten metal which are held within the sleeve 2. If the retention time is less than 2 seconds, only a small amount of proeutectic Si with a mean particle diameter of not less than 7 micrometers is produced, which results in insufficient wear resistance of the die-cast member obtained (emphasis added).

In other words, in order to obtain a higher wear resistance, which is the purpose of Otani and JP ‘723, it is required that the minimum average particle size be not less than 7 μm . Thus, if the average diameter of silicon crystal in the aluminum alloy was 4 μm or less, it would impair the purpose or function of the Otani’s aluminum alloy. Applicant would note that it has been repeatedly held that one having ordinary skill in the art cannot be presumed realistically motivated to modify a reference in a manner inconsistent with the disclosed objectives. *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992); *In re Gordon*, 733 F2d. 900, 221 USPQ 1125 (Fed. Cir. 1984); *In re Schulpen*, 390 F2d. 1009, 157 USPQ 52 (CCPA 1968).

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Applicants respectfully submit that Otani teaches away from adjusting the average diameter of silicon crystal to the range of 4 μm or less.

Accordingly, Applicants respectfully submit that it would not have been obvious to adjust the average grain diameter of silicon in the aluminum alloy to the range of 4 μm or less. Thus, it is submitted that claim 1 and all claims dependent there on are patentable over the cited references. The Examiner is requested to withdraw the rejection of claims 1-5 under 35 U.S.C. § 103(a).

Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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